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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/773,026

02/05/2004

Qi Xiang

039153-0649

6093

34083 7590 03/02/2007
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EXAMINER

DOTY, HEATHER ANNE

ART UNIT

PAPER NUMBER

2813

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/773,026

Applicant(s)

XIANG ET AL.

Examiner

Heather A. Doty

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-18 and 28-30 is/are allowed.
- 6) ☒ Claim(s) 11 and 19-23 is/are rejected.
- 7) ☒ Claim(s) 24-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some.* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 11 is objected to because of the following informalities: Claim 11 ends with "substrate; and". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless – (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11 and 20-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Cheng et al. (U.S. 2002/0072130).

Regarding claim 11, Cheng et al. teaches a method of making an IC structure containing a plurality of transistors (paragraph 0003), the method comprising:

- providing a first semiconductor substrate including a base layer (100 in Fig. 1A), a strained semiconductor layer (102 in Fig. 1A), a semiconductor/germanium layer (104 in Fig. 1A) and a first oxide layer (paragraph 0021);
- attaching a second semiconductor substrate (108 in Fig. 1B) including a second oxide layer (106 in Fig. 1B) to the first oxide layer; and
- separating the base layer from the first substrate (Fig. 1B; paragraph 0024).

Regarding claim 20, Cheng et al. teaches a method of manufacturing an integrated circuit, the integrated circuit comprising a first wafer and a second wafer (Fig. 1B), the first wafer including a semiconductor germanium layer (104), a strained semiconductor layer (102), and a first insulating layer (paragraph 0021 teaches an oxide layer), the second wafer including a substrate (108) and a second insulating layer (106), the second insulating layer being attached to the first insulating layer (paragraph 0021), the method comprising steps of:

- providing the first wafer including the semiconductor germanium layer, the strained semiconductor layer, and the first insulating layer (Fig. 1A);
- attaching the second wafer to the first wafer (Fig. 1B); and
- separating the base layer from the first wafer (Fig. 1B; paragraph 0024).

Regarding claims 21 and 22, Cheng et al. teaches the method of claim 20 and further teaches that the substrate is a bulk silicon substrate, which is a semiconductor material (paragraph 0019).

Regarding claim 23, Cheng et al. teaches the method of claim 20, and further teaches that the semiconductor germanium layer includes a hydrogen breaking surface (see Implanted H^+ in Fig. 1A; paragraph 0020).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. (U.S. 2002/0072130) in view of Yamauchi et al. (U.S. 6,534,380).

Regarding claim 19, Cheng et al. teaches the method of claim 11 (note 35 U.S.C. 102(b) rejection above), but does not expressly teach that the attaching step is a hydrogen bonding step.

Yamauchi et al. teaches attaching two substrates via oxide films by hydrogen bonding. This method of wafer bonding is a direct bonding action that provides effective bonding strength to join two substrates (column 5, lines 56-62).

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use the method taught by Cheng et al. and further use hydrogen bonding to attach the two substrates, since Yamauchi et al. teaches that this method is an effective means of directly bonding two substrates.

Allowable Subject Matter

Claims 24-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 12-18 and 28-30 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Prior art does not teach or suggest, in combination with the other claimed limitations, forming a channel region in the strained semiconductor layer. Cheng et al. teaches removing the strained semiconductor layer from the final device structure, so

Art Unit: 2813

one of ordinary skill in the art would not be motivated to combine other relevant prior art with the teachings of Cheng et al. to arrive at the invention as claimed in claims 24-27.

Similarly, prior art also does not teach or suggest, in combination with the other claimed limitations, providing an aperture within the semiconductor/germanium layer and providing a gate dielectric and gate conductor within this aperture. Cheng et al., on the contrary, teaches forming a device layer on top of the semiconductor/germanium layer. It would therefore not be reasonable to combine other relevant prior art with the teachings of Cheng et al. to arrive at the invention as claimed in claims 12-18 and 28-30.

Response to Amendment

The declaration filed on 9/11/2006 under 37 CFR 1.131 is sufficient to overcome the Ghyselen reference.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather A. Doty, whose telephone number is 571-272-8429. The examiner can normally be reached on M-F, 8:30 - 5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published

Art Unit: 2813

applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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